(2)

EVALUATION OF CASE MANAGEMENT PROCESS FULFILLMENT: THE FIRST SIX MONTHS OF U.S. PUBLIC HEALTH SERVICE OPTICOMAP IMPLEMENTATION IN NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION FLEET OPERATIONS

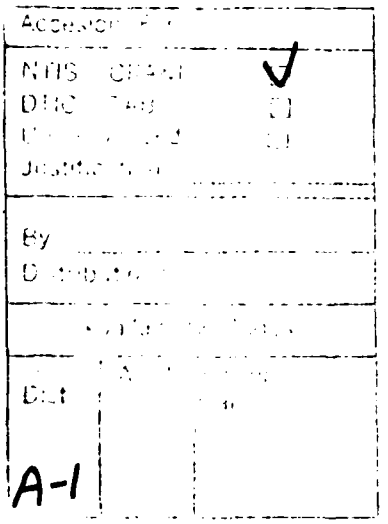
A. HOIBERG

REPORT NO. 89-22

NAVAL HEALTH RESEARCH CENTER
P.O. BOX 85122
SAN DIEGO, CALIFORNIA 92138

NAVAL MEDICAL RESEARCH AND DEVELOPMENT COMMAND
BETHESDA, MARYLAND

EVALUATION OF CASE MANAGEMENT PROCESS FULFILLMENT: THE FIRST SIX MONTHS OF U.S. PUBLIC HEALTH SERVICE OPTICOMAP IMPLEMENTATION IN NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION FLEET OPERATIONS



Anne Hoiberg
Naval Health Research Center
P.O. Box 85122
San Diego, California 92138-9174

Acknowledgement: Special thanks are extended to Sharon Lundin and Angela Quinn of the Western Administrative Support Center, National Oceanic and Atmospheric Administration, Seattle, Washington, for providing the data used in this study and for assisting in various aspects of this research. The author also thanks Jack F. White for conducting the statistical analyses.

Report No. 89-22 was supported by the U.S. Public Health Service. The views expressed in this article are those of the author and do not reflect the official policy or position of the U.S. Public Health Service, the Department of the Navy, Department of Defense, nor any other department or agency of the United States Government.

SUMMARY

Problem

With higher costs projected for compensation and disability, governmental and private agencies have become increasingly aware of the need to implement procedures that will reduce the number of occupational illness and injury cases and lower the associated costs. In the mid-1980s, the U.S. Public Health Service proposed a solution through its funding of the development of an occupational illness and injury contingency management process (OPTICOMAP) that encompasses cost containment, care coordination, and case management. The Naval Health Research Center was tasked with conducting evaluation studies of the six and twelve months of OPTICOMAP implementation.

Objectives

The purpose of this study was to analyze the effectiveness of OPTICOMAP as assessed on criteria subsumed under three evaluation levels (process, impact, and outcome) during the first six months of implementation to be contrasted with evaluations of cases from a pre-implementation period.

Approach

Participants included 42 maritime wage marines who experienced an occupational injury or illness during the first six months of OPTICOMAP implementation (October 1987 to March 1988) and 29 maritime wage marines who had sustained an occupational injury or illness from October 1985 to March 1986. No significant differences between samples were noted for age, sex, income, and injury severity. An instrument was created to assess the process and impact evaluation criteria and subcriteria of case management, return-to-work plans, timeliness, and role fulfillment of the key participants of line supervisor, care coordinator-case facilitator (CC-CF), attending case managing physician (ACMP), and line supervisor. A costs instrument was developed to compute and/or compile the numerical variables of monetary costs, time in days, and time in terms of letters and telephone calls. Univariate methods of analysis were conducted on comparisons of means and proportions between years, whereas multiple regression analyses were performed on the three criteria of implementation of and adherence to the case management process or OPTICOMAP, efficiency in closing cases, and number of work days lost. Dependent variables were income, severity of injury, and role fulfillment ratings.

Results

While improvements were observed for all process and impact evaluation criteria (implementation of OPTICOMAP and return-to-work plans, timeliness, and role fulfillment), the only statistically significant changes were noted for two subcriteria subsumed under the criterion of impact of OPTICOMAP on timeliness: follow-up contacts with the injured employee by the line supervisor and CC-CF and responsiveness of the claims examiners at the Department of Labor, Office of Workers' Compensation (DOL OWCP). Results also showed that mean costs for medical care, compensation payments, and lost time wages decreased after OPTICOMAP implementation. A significant decrease in the duration of a case (from a mean of four months per case to two months), also occurred. Other outcome results included a significant increase in the number of injured workers who were returned to light duty and a significant decrease in the extent of involvement in the case by the line supervisor, CC-CF, and DOL OWCP. The roles of the CC-CF, ACMP, and line supervisor were identified as the strongest correlates of case closure (75.9% of the variance) while the roles of the line supervisor and ACMP accounted for almost 60% of the variance of the criterion of implementation of the case management process or OPTICOMAP. Time lost from work was determined to be a function of injury severity and a lower income level.

Conclusions

Cost-related consequences of OPTICOMAP implementation include reductions in medical care, lost time, and compensation costs. Increases in the number of workers returned to light duty and decreases in the number of days to case closure reflect significant improvements after OPTICOMAP implementation. With a more fully operational OPTICOMAP, evaluations of implementation of and adherence to OPTICOMAP, return-to-work plans, timeliness, and role fulfillment would be expected to yield higher ratings of effectiveness in the future.

Recommendations

Recommendations consist of an even greater expansion of opportunities for light duty, greater adherence to the service provision events of OPTICOMAP, and more concerted efforts to initiate and maintain contact with injured workers throughout the duration of their convalescence periods.

Evaluation of Case Management Process Fulfillment: The First Six Months of U.S. Public Health Service OPTICOMAP Implementation in National Oceanic and Atmospheric Administration Fleet Operations

Anne Hoiberg

Workers' compensation benefit payments to U.S. employees totaled $13.4 billion in 1980, $15.0 billion in 1981, and $16.1 billion in 1982 (Price, 1983, 1984a, 1984b). By 1985, compensation expenditures had reached $22.5 billion. In examining civilian injury compensation costs of the four branches of the armed forces, the totals almost doubled during the 1980s, from $235 million in 1980 to $405.9 million in 1988 (Rossbach, 1988). Increases in percentages of corporate payrolls allocated to workers' compensation also have been reported: from 1.1% during the early 1970s to 2.1% of a much larger payroll in 1983 (Kurt, 1984). With increasingly higher costs projected for compensation and disability, governmental agencies, private organizations, and insurance companies have become exceedingly aware of the need to implement procedures and programs that not only will reduce the number of incidents of occupational illness and injury but also will lower the costs associated with each episode.

Honeywell ("Honeywell's Case," 1986) has reported that its case management program focuses on reducing the high costs generated by frequent users or, in Honeywell's case, 8% of all insureds who account for 78% of all claims dollars. Four criteria are suggested for selecting an agency to provide the services needed in managing high-using cases: an agency's program should concentrate on rehabilitation and getting injured employees back to work as soon as possible; its case managment procedure should address employee and employer issues (e.g., needs of the injured worker, his or her family situation, the proposed treatment plan, available resources, and the work environment); the agency should have onsite evaluating capabilities; and it should be able to monitor cases at various locations.

The case management process implemented at the Chrysler Corporation ("Health Data Help," 1986) has been especially effective in lowering costs attributable to job-related injuries. The areas identified as requiring

careful assessment include performance of laboratory tests, podiatrist services, prescription of medications, dermatology care, and acute care hospitalizations. One cited example of inappropriate or questionable therapy is that of hospitalizing injured workers for nonsurgical lower back pain treatment, which consists primarily of bed rest. The suggested solution is not to hospitalize back injury cases, but to prescribe bed rest at home. After consulting with hospital administrators, who in turn contacted physicians, the number of admissions for lower back pain was reduced by 64% during the first six months after the review of health care utilization. Other changes involved limiting the costs of medications to the amount charged for generic drugs, decreasing the duration of maternity stays for normal deliveries, screening all foot surgeries, reviewing medical bills for accuracy, implementing a dental health maintenance organization program, and requiring the use of preferred providers. After initiating these recommendations, Chrysler reported a savings of more than $100 million at the end of three years.

The nation's largest medical case management service, Intracorp, is designed to seek out the most cost-effective, quality treatment, which centers on reducing inpatient care and increasing in-home care while monitoring the case, family, and community's resources (Zeldis, 1987). Immediate intervention is shown to be essential, but equally important to the recovery process is the need for follow-through. Intracorp has been reported to save companies from $8 to $13 for each dollar of expenditure for its case managers' services which typically are performed by nurses. This program seems to be especially effective with medical catastrophes and somewhat less so with mental health and substance abuse cases. Savings may not accrue at first, but case management is less expensive than hospitalization in the long term ("Case Management Alternatives," 1987).

Active participation by labor organizations also can prove beneficial in the overall goal of cost containment. Polakoff (1983) suggests that unions compile computerized baseline data on each member's job history, health and medical history, and exposures. This information can be used (1) to determine whether or not relationships exist between a characteristic and the incidence of an occupational illness or injury and (2) to conduct periodic and ongoing analyses as well as to identify any health changes occurring in a specific

occupation. Perhaps of greatest importance is the recommendation to develop a union-based comprehensive health maintenance program for both members and their families. These recommendations are based on data compiled from records of an engineering union, results that support a union's participation in trimming health-related costs (Polakoff, 1983).

The beneficial effects of psychotherapy also have been promulgated as contributing factors in decreasing utilization of both inpatient and outpatient medical services (Mumford, Schlesinger, Glass, Patrick, & Cuerdon, 1984; Schlesinger, Mumford, Glass, Patrick, & Sharfstein, 1983; Hoiberg, 1988a). Fagin (1983) cites the conclusion of Mumford and her colleagues (1982), "A review of thirteen studies that used hospital days post surgery or post heart attack as outcome indicators showed that on the average psychological intervention reduced hospitalization approximately two days below the control group's average. . . the evidence is that psychological care can be cost effective."

Effective case management encompasses several features, such as preadmission certification; reviews of all accidental causes of hospitalization both on and off the job; balanced and cost-controlled selection of alternatives during treatment and convalescence; monitoring of inpatient hospital stays to avoid unnecessary surgery, testing, and extention of the hospitalization; implementation of a discharge plan; the use of a qualified second opinion; an auditing of hospital bills; and utilization of data analyses (Eshelman, 1986). Future trends include an expansion of medical case management programs, pre-admission certifications in such areas as psychiatric treatment and substance abuse programs, and preferred providers or health maintenance organizations (HMOs). Utilization review programs also have proven effective in lowering costs for hospital use and medical expenditures (Feldstein, Wickizer, & Wheeler, 1988).

In the mid-1980s, the U.S. Public Health Service funded a project to develop an occupational illness and injury contingency management process (OPTICOMAP) that would encompass not only cost containment but also care coordination and claims management ("Watchcare Corporation," 1987). This model process is based on the philosophy that case management should (a)

enhance the personal aspects of managing an injured employee case and (b) incorporate an increased understanding of the significance of psychosocial factors with respect to the healing process. OPTICOMAP emphasizes the importance of returning injured employees to the work place, especially before they manifest symptoms of delayed recovery syndrome. This condition denotes cases in which a physical injury appears to have occurred, but recovery is delayed beyond normal expectations for some apparently "nonphysical" reason ("Watchcare Corporation," 1987). Outlined in 28 series, OPTICOMAP specifies the service provision events for each of the six key participants to follow from the date of the occupational injury or illness to the date of return to work and/or case closure; each participant adheres to the series to ensure fulfillment of his or her role and the process as a whole ("Watchcare Corporation," 1987). The six participants include the care coordinator-case facilitator (CC-CF), attending case managing physician (ACMP), line supervisor, primary care provider, medical consultant, and responsible environmental manager.

The Naval Health Research Center, San Diego, was tasked with designing and conducting the baseline research and evaluation studies of the efficacy of OPTICOMAP in achieving the aforementioned objectives as well as restoring injured employees to their full potential and successfully enacting return-to-work plans. The evaluation program developed for this study centered on three levels of evaluation: process, impact, and outcome (Green & Lewis, 1986). Process evaluation assessed the extent to which OPTICOMAP and return-to-work plans were implemented and followed. Impact evaluation pertained to the effect that OPTICOMAP had on ensuring timeliness, a return to light or regular duty, and fulfillment of each participant's role in case management. Outcome evaluation measured criteria associated with costs and time. The evaluation program consisted of two parts: a report at the end of the first six months of implementation and another report at the conclusion of the one-year testing period of OPTICOMAP. OPTICOMAP was implemented in a maritime operational setting, the Pacific Marine Center (PMC), National Ocean Service, Office of Marine Operations, in October 1987.

The purpose of this study was to analyze the effectiveness of OPTICOMAP as assessed on criteria subsumed under the three aforementioned evaluation levels during the first six months of implementation to be contrasted with

evaluations of cases from a pre-implementation period. Occupational injury and illness cases recorded in the maritime wage marine work force of the PMC from two time periods were selected for comparative purposes: the 42 cases from the post-OPTICOMAP implementation phase (the first six months of FY1988) to be compared with the 29 cases from the first six months of FY1986 (the pre-OPTICOMAP phase).

METHOD

Participants

Participants in this study included the 42 PMC maritime wage marines who experienced an occupational injury or illness during the first six months of OPTICOMAP implementation (1 October 1987 to 31 March 1988) and 29 PMC maritime workers who had sustained an occupational injury or illness during the pre-OPTICOMAP phase of 1 October 1985 to 31 March 1986. These incidents occurred either onboard one of the National Oceanic and Atmospheric Administration (NOAA) vessels, on liberty in a port of call, or at a shore facility while the ship was in port. The 29 cases from 1985-86 were part of 100 cases examined for two baseline studies, one of which centered on epidemiologic comparisons and the other an evaluation of case managment processes at both the PMC and Atlantic Marine Center (Hoiberg, 1988b, 1989). The rationale and description of the evaluation program are described in detail in those reports.

Table 1 is a presentation of the distribution of the occupationally sustained conditions for the two samples in the current study (i.e., 1985-86 and 1987-88). These cases had been evaluated in terms of severity of injury; no significant difference between samples was observed in mean levels of injury seriousness. The samples also did not differ significantly on age and sex composition. Other comparisons showed that the average annual incomes of the two samples were quite similar with no significant difference obtained.

Instruments and Analyses

Evaluation instrument. An instrument was created to assess the criteria and subcriteria of the process and impact evaluation levels, which are presented in Table 2. A rating system was devised to evaluate the extent of OPTICOMAP implementation as well as fulfillment and timeliness of each criterion and subcriterion. The subcriteria were scored according to the Likert-

TABLE 1

Frequency and Percentage Distribution of Occupational Injury and Illness Cases in the National Ocean Service Wage Marine Force across Time Frames

	1985-86		1987-88	
Injury/Illness Site	No.	%	No.	%
Ankle, knee	9	31.0	6	14.3
Back, spine, disc	8	27.6	6	14.3
Hand, arm	5	17.2	12	28.6
Trunk, head	1	3.5	6	14.3
Teeth, face	2	6.9	4	9.5
Eye, eyelid	3	10.3	4	9.5
Multiple bruises	0	-	1	2.4
Heart attack	0	-	1	2.4
Pilonidal cyst	0	-	1	2.4
Hearing loss	1	3.5	1	2.4
Total	29	100.0	42	100.1

style values of "1" for noneffective to "5" for effective with "3" as neither effective nor noneffective. Values for the criteria (from "1" to "5") were computed by calculating a mean across the subcriteria scores.

As shown in Table 2, the two criteria of process evaluation included implementation of and adherence to case management or OPTICOMAP and return-to-work plans, with three and two subcriteria identified for each criterion, respectively. Impact evaluation criteria consisted of OPTICOMAP timeliness (with the three subcriteria of case follow-up by the CC-CF and line supervisor, nine phases of the case management process, and responsiveness to CC-CF submissions by the Department of Labor, Office of Worker's Compensation Programs (DOL OWCP)); opportunities for light and regular or modified duty; and role fulfillment of the CC-CF, ACMP, and line supervisor. To measure the extent of role fulfillment of the line supervisor, for example, the case record was examined to determine whether or not the supervisor had arranged for medical care within 24 hours of the injury, which would yield an effective rating of "5"; if 48 hours had elapsed before treatment was provided, the rating dropped to "4," and so forth. Other time-based ratings were recorded for the line supervisor's signing and forwarding of the appropriate injury/

TABLE 2

Three Facets of an Evaluation Program

Process Evaluation	Impact Evaluation	Outcome Evaluation
Implementation of and Adherence to Process: initial response, initial care, ongoing care	Timeliness: follow-up of case; case management; Department of Labor, Office of Workers' Compensation Programs (DOL OWCP)	Case Closure: obstacles (e.g., hospital/clinic, physician, case manager, DOL OWCP, injured employee)
Return-to-work Plan: implementation of light and/or regular duty plan	Return-to-Work Plan: light or limited duty, regular or new job duty	Return-to-work Plan: number of workers on the job
	Role Fulfillment: line supervisor	Work Time Lost: number of days (e.g, continuation of pay, sick or annual leave, compensation)
	Role Fulfillment: case manager	
	Role Fulfillment: attending physician	Costs: expenditures for medical care, reasonableness of medical care costs
	Role Fulfillment: injured employee	
	Role Fulfillment: DOL OWCP	Costs: expenditures for disability/compensation
	Role Fulfillment: responsible environmental manager	Costs: days for form filing
	Role Fulfillment: primary care provider	Costs: adherence to process (e.g., letters, telephone calls, excessive involvement)
	Role Fulfillment: medical consultant	

illness forms within a set time period as required by the DOL OWCP. Also evaluated was the extent of the line supervisor's participation in the injured employee's return-to-work plan. Similarly, the other two key participants were evaluated in accordance with fulfillment of their roles as specified in the OPTICOMAP service provision events. The 71 cases were evaluated by two individuals who independently examined data contained in the case record, followed by a third individual's review of the raters' evaluations. When the raters disagreed, the issue was discussed, and a mutually agreed-upon rating was assigned. Mean scores on each criterion were computed, and comparisons were conducted between pre- and post-OPTICOMAP phases.

Costs in time and monetary expenditures instrument. For the outcome evaluation criteria, the following numerical variables of monetary costs, time in days, and time involved in communications were computed and/or compiled on the costs instrument: amount of costs charged to PMC for medical care, compensation and disability, and mean wages for lost work time; number of days lost from work and continuation of pay days; duration of time to effectuate case closure; number of days tabulated for filing of DOL OWCP forms; costs attributable to OPTICOMAP adherence in terms of numbers of letters mailed and telephone calls logged as well as excessive involvement of key participants (also determined by numbers of letters and telephone calls); number of case closures that were delayed by 30 or more days and the participant(s) or hospital/clinic causing the delay; number of injured employees who were returned to light and regular duty; and number of injured employees manifesting symptoms of delayed recovery syndrome.

Analyses. Univariate methods of analysis were conducted on comparisons of means and proportions between years: a t-test value was computed to determine the level of statistical significance between means, and a chi square was calculated to test the level of significance between proportions. Multiple regression analyses were performed on three criteria in each sample to ascertain the amount of variance accounted for by the variables of age; income; role fulfillment ratings of the line supervisor, CC-CF, and ACMP; and severity of the injury (ratings from "1" for a minor case to "5" for death). The three criteria included: implementation of and adherence to the case management process or OPTICOMAP, efficiency in closing cases, and number of work days lost.

RESULTS

Process Evaluation

Implementation of and adherence to case management and return-to-work plans. As shown in Table 3, improvements in implementation of and adherence to the case management process as well as return-to-work plans were observed for all of the subcriteria from the pre- to post-OPTICOMAP periods, although none of the *t*-test values reached the level of statistical significance. These nonsignificant results suggested that OPTICOMAP and return-to-work plans were not fully implemented within the first six months of the testing period. The trend, however, was toward greater adherence for the subcriteria of return-to-light duty plans and provision of ongoing medical care. The subcriterion of OPTICOMAP with the lowest ratings for both time periods was that of initial contact between the injured worker and his/her line supervisor and the CC-CF, findings that clearly reflected a need for improvement.

TABLE 3

Means and Standard Deviations of Process Evaluation Variables of Occupational Illness and Injury Cases in the National Ocean Service Wage Marine Force, Pacific Marine Center

	1985-86		1987-88			
Criterion/Subcriterion	M	SD	M	SD	t	p
Implementation of and Adherence to Process (OPTICOMAP)	3.14	1.22	3.52	0.99	1.47	NS
Initial care within 24 hours	3.92	1.81	4.47	1.24	1.36	NS
Initial contact with supervisor/case manager	2.50	0.96	2.54	1.03	0.15	NS
Ongoing care received	4.14	1.41	4.78	0.75	1.60	NS
Return-to-work Plan	3.68	1.53	3.82	1.14	0.32	NS
Return to light work	3.00	1.80	4.06	1.25	1.76	NS
Return to regular work	4.06	1.55	4.10	1.22	0.09	NS

Note. The time periods represent pre- and post-OPTICOMAP (case management process) implementation (1985-86 and 1987-88, respectively).

Impact Evaluation

Timeliness and role fulfillment. The results presented in Table 4 pointed up that the ratings on the variables of follow-up of the injured worker case and responsiveness of the DOL OWCP increased significantly from the pre- to post-OPTICOMAP time frame. Such findings indicated that the case management process had a greater impact on case follow-up by the line supervisor and CC-CF during the post- than pre-implementation period. Also, letters mailed from the DOL OWCP to the CC-CF were prepared and mailed in a more timely fashion subsequent to OPTICOMAP implementation. No significant changes from 1985-86 to 1987-88 were observed on ratings of effectiveness of meeting the nine case management steps nor of the three key participants fulfilling their case management roles.

TABLE 4

Means and Standard Deviations of Impact Evaluation Variables of Occupational Illness and Injury Cases in the National Ocean Service Wage Marine Force, Pacific Marine Center

	1985-86		1987-88			
Criterion/Subcriterion	M	SD	M	SD	t	p
Timeliness of Process	3.34	1.17	3.71	0.86	1.53	NS
Follow-up of case	2.81	1.60	3.74	1.24	2.31	.025
Case management	3.24	1.43	3.52	1.11	0.94	NS
DOL OWCP	2.88	1.50	3.92	1.11	2.81	.007
Role Fulfillment:						
Line supervisor	3.10	1.40	3.26	1.11	0.53	NS
Case manager	3.59	1.09	3.71	0.97	0.52	NS
Attending physician	3.44	1.34	3.78	1.29	1.02	NS

Note. The time periods represent pre- and post-OPTICOMAP (case management process) implementation (1985-86 and 1987-88, respectively).

Outcome Evaluation

Costs: Medical care, compensation, and labor. Monetary costs for medical care and compensation benefits on the average decreased between the pre- and post-OPTICOMAP time frames of the study. Mean costs for medical care and compensation benefits as well as labor costs for both time periods are pre-

sented in Table 5. Costs for labor, as determined by multiplying the number of work days lost by the average daily wage for each injured worker, also decreased with time.

TABLE 5

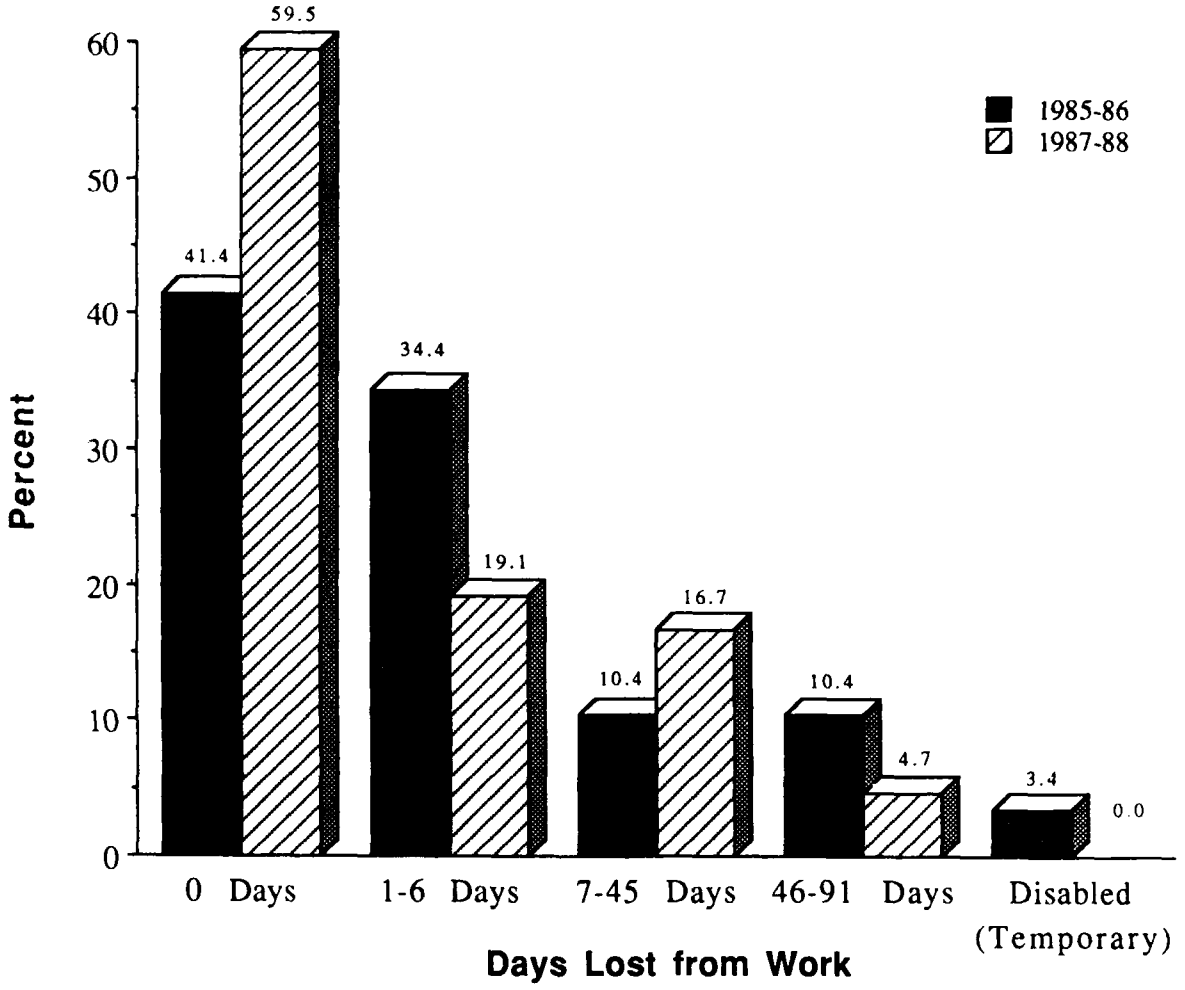
Means of Outcome Evaluation Variables (Costs)
of Occupational Illness and Injury Cases
in the National Ocean Service Wage Marine Force, Pacific Marine Center

Criterion	1985–86 M	1987–88 M
Costs: Medical care	$ 443.	393.
Costs: Compensation payments	$7,106.	0
Costs: Mean wages per occupational injury or illness	$ 523.	386.

Note. The time periods represent pre- and post-OPTICOMAP (case management process) implementation (1985–86 and 1987–88, respectively).

Costs: Time in days. As can be seen in Figure 1, 25 employees of the 42 cases from the post-OPTICOMAP phase (59.5%) did not lose any time from work because of an occupational injury or illness. The number of work days lost among the 17 employees ranged from one to 70 days, with all 17 returning to work. By way of contrast, the percentage of employees who did not lose any time from work during the pre-OPTICOMAP phase was 41.5% or 11 of the 29 cases. One employee had not returned to work at the end of follow-up (and still remains on disability) whereas the other cases represented a range from one to 91 days lost from work. According to the definition of delayed recovery syndrome, the individual listed on the periodic disability rolls appeared to be manifesting symptoms of this condition.

Figure 1: Percentage Distribution of Work Days Lost among Occupationally Injured Wage Marines by Year



In Table 6 are shown the mean number of days computed for the criteria of work time lost, duration of a case from the date of injury to date of case closure, and filing of DOL OWCP forms for both time frames. The only significant decrease observed in this tabular presentation was the difference in mean number of days recorded for the duration of an occupational injury or illness case, which suggested that specified service provision events of OPTICOMAP were being performed with increased efficiency. Other comparisons determined that the number of work days lost decreased somewhat after OPTICOMAP imple-

mentation whereas the means for continuation of pay days were quite similar at approximately seven days. In examining the mean number of days computed for the filing of the two most important DOL OWCP forms, a larger decline in means occurred for the CA-20 than CA-1 form, although the t-test value did not reach the level of statistical significance.

TABLE 6

Means and Standard Deviations of Outcome Evaluation Variables (Time) of Occupational Illness and Injury Cases in the National Ocean Service Wage Marine Force, Pacific Marine Center

	1985-86		1987-88			
Criterion/Subcriterion	M	SD	M	SD	t	p
Work Time Lost:						
Days lost from work	12.04	24.99	8.38	17.31	0.66	NS
Days of continuation of pay	6.96	14.41	6.88	13.57	0.03	NS
Duration of Case:						
Days from injury to closure	130.79	155.93	63.56	55.33	2.19	.036
Claims Form Filing:						
Days of CA-1 to DOL OWCP	23.07	37.62	20.10	11.49	0.41	NS
Days of CA-20 with ACMP	12.58	22.31	6.97	12.02	1.16	NS

Note. The time periods represent pre- and post-OPTICOMAP (case management process) implementation (1985-86 and 1987-88, respectively).

Costs: Adherence to OPTICOMAP. The values presented in Table 7 suggested that adhering to OPTICOMAP showed a slight (and nonsignificant) decrease in the actual number of pieces of correspondence prepared by the CC-CF and DOL OWCP. The mean number of telephone calls logged increased, which reflected a greater adherence to promoting personal contacts with the injured employee, although the difference in means between time frames was nonsignificant.

TABLE 7

Means and Standard Deviations of Outcome Evaluation Variables of Occupational Illness and Injury Cases in the National Ocean Service Wage Marine Force, Pacific Marine Center

Criterion/Subcriterion	1985–86 M	1985–86 SD	1987–88 M	1987–88 SD	t	p
Costs: Adherence to Process	3.31	1.58	3.86	1.32	1.58	NS
Letters to/from case manager	5.14	5.53	4.38	4.36	-0.64	NS
Letters from DOL OWCP	1.79	2.91	1.57	1.47	-0.38	NS
Telephone calls: Logged by case manager	1.41	4.12	3.38	5.30	1.68	NS

Note. The time periods represent pre- and post-OPTICOMAP (case management process) implementation (1985–86 and 1987–88, respectively).

Other costs. In assessing the effectuation of a timely processing and closing of each case, a delay of 30 days or more was considered noneffective. In comparisons of proportions of cases from one time frame to the other, as shown in Table 8, the percentages calculated for each of the six categories decreased after OPTICOMAP implementation, although the declines were statistically nonsignificant. Other findings indicated that significantly more injured employees were returned to light or limited duty in 1987–88 than 1985–86. In comparisons of proportions of key participants (e.g., the ACMP, CC–CF, line supervisor, or claims examiner at the DOL OWCP) who were excessively involved in the cases, as reflected by the number of letters and telephone calls recorded, the results also showed a significant decrease in the proportions of individuals other than the ACMP who were overly involved with paperwork and telephone calls.

TABLE 8

Frequency and Percentage Distribution of Outcome Evaluation Variables of Occupational Illness and Injury Cases in the National Ocean Service Wage Marine Force, Pacific Marine Center

Criterion/Subcriterion	1985-86 No.	1985-86 %	1987-88 No.	1987-88 %	χ^2	p
Delayed Case Closure:						
Line supervisor	29	13.8	42	7.1	0.85	NS
Case manager	29	20.7	42	11.9	1.01	NS
Attending physician	29	17.2	42	11.9	0.40	NS
DOL OWCP	29	17.2	42	11.9	0.40	NS
Hospital/clinic	29	17.2	42	9.6	0.92	NS
Injured employee	29	10.3	42	9.6	0.01	NS
Return to Light Duty:						
Injured employees	29	13.8	42	35.7	4.21	.040
Costs: Excessive Involvement:						
Attending physician	29	24.1	42	14.3	1.11	NS
All other participants	29	31.0	42	11.9	3.97	.046

Note. The time periods represent pre- and post-OPTICOMAP (case management process) implementation (1985-86 and 1987-88, respectively).

As shown in Table 9, several variables were identified as significant correlates of the three criteria. In examining results of the multiple regression analyses on the criterion of implementation of and adherence to a case management process or OPTICOMAP, a large percentage of the variance (57.8%) was accounted for by the key participants of the line supervisor and attending physician. Both of these individuals participated in the process of providing appropriate medical care during the initial, most crucial phase of an occupational injury. Results of analyses on the second criterion revealed the significant contributions made by the CC-CF, ACMP, and line supervisor in the processing and closing of cases subsequent to OPTICOMAP implementation; such findings underscored the responsibility that these individuals assumed in managing cases from the date of injury to date of case closure. For the third criterion examined, number of days lost from work was shown to be correlated with severity of the injury/illness and level of income. That is, individuals

who experienced a more serious injury and earned a lower level of income were more likely than others to lose more time from work because of their injury.

TABLE 9

Summary of Multiple Regression Analyses of Selected Correlates and Case Management Criteria of Occupational Illness and Injury Cases in the National Ocean Service Wage Marine Service, Pacific Marine Center

Variable	1985-86 (n = 28) r	1985-86 (n = 28) R	1987-88 (n = 42) r	1987-88 (n = 42) R
Criterion: Implementation of and Adherence to Case Management Process or OPTICOMAP		.810		.760
Correlate: Line supervisor	.768		.716	
Correlate: Attending physician (ACMP)	.402		.366	
Criterion: Case Closure		.726		.871
Correlate: Case manager (CC-CF)	----		.805	
Correlate: Attending physician (ACMP)	.726		.475	
Correlate: Line supervisor	----		.465	
Criterion: Days Lost from Work		.624		.752
Correlate: Severity of injury/illness	.624		.620	
Correlate: Annual income	----		-.543	

Note. The time periods represent pre- and post-OPTICOMAP (case management process) implementation (1985-86 and 1987-88, respectively).

DISCUSSION

Results of this study will be discussed in terms of (a) the "bottom line" issue of cost containment and (b) the overall evaluation of OPTICOMAP as an effective tool in case management. First, the cost effectiveness of OPTICOMAP will be examined by ascertaining whether or not the costs with case management are less than or exceed those from the pre-OPTICOMAP period. The outcome criteria to be discussed include the costs of medical care, compensation, and labor as well as the time factors associated with days lost from work, return-to-work plans, filing of forms, case closures, and case involvement of key participants. Second, the overall effectiveness of OPTICOMAP will be assessed by concentrating on the evaluation of process and impact criteria.

With a reduction in monetary expenditures observed subsequent to OPTICOMAP implementation, it can be concluded that the cost-related consequences of this case management process are favorable. Not only medical care costs but also labor benefit payments, which include continuation of pay as well as annual, sick, and shc e leave, are shown to decrease during the first six months of OPTICOMAP implementation. No compensation costs are reported for the 1987-88 period which is attributed to the fact that all of the workers injured during the first six months of the evaluation phase returned to work and, therefore, no compensation payments are listed. These decreases in costs seem to reflect a higher level of dedication on the part of the CC-CF and ACMP in managing cases more expeditiously, a conclusion that corresponds with results of the multiple regression analyses on the variable of case closure. That is, the greater efficiency observed in the follow-through of cases from date of injury and treatment to date of closure during the 1987-88 time period is related to an increasing level of adherence to the CC-CF and ACMP service provision events as specified in OPTICOMAP. Further, this interpretation is supported by reductions noted in the mean number of days of the life of a case, increases in opportunities for light work, and increases in follow-up contacts with the injured employee by the line supervisor and CC-CF.

The timely closing of cases of occupational injury and illness is the major responsibility of the CC-CF. During the post-OPTICOMAP period, cases are closed in significantly fewer days primarily because all injured workers are back to work and the appropriate forms and billing statements have been received without the need for the mailing of several reminders. Therefore, a smoother processing of cases is observed. The significant reduction in the extent of involvement of the CC-CF, line supervisor, and DOL OWCP in case management also enhances the efficient processing of cases and decreases management costs.

The other key participant in this study is the ACMP, a Public Health Service physician who has contributed considerably to the post-OPTICOMAP reductions in monetary costs. The major explanation for the ACMP's impact is that injured workers tend to continue their "onsite" medical care with him rather than seeking the more costly treatment from their own physicians. The ACMP's awareness of wage marine work settings and job requirements, which has

enabled him to appropriately determine fitness for various levels of duty (i.e., from fit for light duty to fit for sea duty), also has had a beneficial effect on containing costs as inferred by a decrease in mean labor expenditures and an increase in the number of workers who did not lose any time from work in 1987-88. Associated with this increase in the number of workers with no lost time is the significant increase in opportunities for light duty. In conjunction with the ACMP, the CC-CF and line supervisor work together in developing opportunities for light duty. Perhaps the most important outcome of OPTICOMAP implementation is this significant increase in the number of injured workers who are returned to light duty. No doubt this change contributes to the lower medical care and labor costs and mean number of work days lost recorded from the pre- to the post-OPTICOMAP period. Other cost containment efforts are those that accrue from wages paid for performance of light duty, rather than continuation of pay costs combined with wages that would have to be paid for a replacement of the injured worker. In general, these increases in light duty assignments support the new rationale in rehabilitation endeavors which is that bed rest and inactivity produce deconditioning, whereas activity and prescribed exercise promote restoration of well-being (Delisa, Godar, & Mooney, 1988).

For the second part of this discussion, the mean ratings reflect a need to implement more fully the service provision events of OPTICOMAP. Specific requirements of OPTICOMAP call for the arrangement of immediate medical care and ongoing treatment, as needed, for injured employees. One of the difficulties in following OPTICOMAP's specific time requirements is that the vessels frequently are at sea, which prevents immediate emergency hospital or ongoing specialist care and a timely processing of DOL OWCP forms. The seagoing nature of this population's operations also deters the CC-CF from having immediate contact with the injured worker. Other considerations are that some injuries do not require immediate care (e.g., a chipped tooth), or the injured worker is convinced that his or her pain will resolve without treatment. Under these circumstances, adherence to OPTICOMAP can be very difficult.

The impact of OPTICOMAP also is observed in ratings on the criteria and subcriteria of timeliness and role fulfillment. Perhaps the most important finding is an improvement in initiating follow-up contacts with the injured

worker by the line supervisor and CC-CF. Greater attention to the injured worker is an important goal of OPTICOMAP. Comparisons of ratings on role fulfillment criteria, on the other hand, reveal nonsignificant improvements with OPTICOMAP implementation. Perhaps an increased familiarity with the service provision events of OPTICOMAP will be observed during the second six months of the testing year, which would be noted in higher ratings of effectiveness during the evaluation process.

In conclusion, it should be emphasized that no aspect of case management shows a decrease in effectiveness nor an increase in costs with OPTICOMAP implementation. The most important recommendations of this study include an even greater expansion of opportunities for light duty, greater adherence to OPTICOMAP, and expanded efforts to initiate and maintain contact with the injured worker throughout his or her convalescence. Other aspects of cost containment and case management, which are not addressed in this study but should be considered in the future, are the auditing of bills submitted from hospitals and private health care providers and the attaining of a second medical opinion. Such efforts would be expected to result in cost benefits, as Eshelman (1986) reports. With an incorporation of these suggestions, the objectives of cost containment and restoration of injured workers to their full potential and to the work force will have a greater probability of being met.

REFERENCES

Case management alternatives save money, lives. (1987). Employee Benefit Plan Review, 42, 108-110.

Delisa, J.A., Godar, T.J., & Mooney, V. (1988). Improving disability assessment. Patient Care, Nov, 59-92.

Eshelman, C. (1986). Quick fix is no cure for rising medical benefit costs. Risk Management, 33, 54-60.

Fagin, C.M. (1983). Concepts for the future: Competition and substitution. Journal of Psychosocial Nursing and Mental Health Services, 21, 36-40.

Feldstein, P.J., Wickizer, T.M., & Wheeler, J.R.C. (1988). Private cost containment: The effects of utilization review programs on health care use and expenditures. New England Journal of Medicine, 318, 1310-1314.

Green, L.W., & Lewis, F.M. (1986). Measurement and Evaluation in Health Education and Health. Palo Alto, Calif.: Mayfield.

Health data help Chrysler save $100 million. (1986). Employee Benefit Plan Review, 41, 10-12.

Hoiberg, A. (1988a). A Cost Containment Case for Occupational Illness and Injury Case Management (Report No. 88-22). San Diego, Calif.: Naval Health Research Center.

Hoiberg, A. (1988b). Epidemiologic Research on Occupational Illness and Injury in the National Ocean Service Wage Marine Work Force (Report No. 88-24). San Diego, Calif.: Naval Health Research Center.

Hoiberg, A. (1989). A Baseline Study of Occupational Illness and Injury Case Management in a Federal Maritime Work Force (Report No. 89-1). San Diego, Calif.: Naval Health Research Center.

Honeywell's case management program. (1986). Employee Benefit Plan Review, 41, 12.

Kurt, T.L. (1984). Workers' compensation: New worries for an old headache. Occupational Health and Safety, 53, 68.

Mumford, E., Schlesinger, H.J., & Glass, G.V. (1982). The effects of psychological intervention on recovery from surgery and heart attacks: An analysis of the literature. American Journal of Public Health, 72, 141.

Mumford, E., Schlesinger, H.J., Glass, G.V., Patrick, C., & Cuerdon, T. (1984). A new look at evidence about reduced cost of medical utilization following mental health treatment. American Journal of Psychiatry, 141, 1145-1158.

Polakoff, P.L. (1983). Unions can help trim health costs. Occupational Health and Safety, 52, 35-37.

Price, D.N. (1983). Workers' compensation: Coverage, benefits, and costs, 1980. Social Security Bulletin, 46, 14-19.

Price, D.N. (1984a). Workers' compensation program experience, 1981. Social Security Bulletin, 47 (4), 8-12.

Price, D.N. (1984b). Workers' compensation: Coverage, benefits, and costs, 1982. Social Security Bulletin, 47 (12), 7-13.

Rossbach, P. (1988). Department of Defense proposed amendments in the Federal Employees' Compensation Act (FECA). Presentation at the Injury Compensation Workshop, San Diego, CA, 25 Oct 88.

Schlesinger, H.J., Mumford, E., Glass, G.V., Patrick, C., & Sharfstein, S. (1983). Mental health treatment and medical care utilization in a fee-for-service system: Outpatient mental health treatment following the onset of a chronic disease. American Journal of Public Health, 73, 422-429.

Watchcare Corporation Research and Development Team (1987). Occupational Illness and Injury Contingency Management Process I. Seattle, Wash.: U.S. Public Health Service.

Zeldis, N. (1987). Intracorp: A new force in healthcare. Management Review, 76, 14-15.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a REPORT SECURITY CLASSIFICATION Unclassified	1b RESTRICTIVE MARKINGS N/A
2a SECURITY CLASSIFICATION AUTHORITY N/A	3 DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.
2b DECLASSIFICATION/DOWNGRADING SCHEDULE N/A	
4 PERFORMING ORGANIZATION REPORT NUMBER(S) NHRC Report No. 89-22	5 MONITORING ORGANIZATION REPORT NUMBER(S)
6a NAME OF PERFORMING ORGANIZATION Naval Health Research Center 6b OFFICE SYMBOL (If applicable) 40	7a NAME OF MONITORING ORGANIZATION Commander Naval Medical Command
6c ADDRESS (City, State, and ZIP Code) P.O. Box 85122 San Diego, CA 92138-9174	7b ADDRESS (City, State, and ZIP Code) Department of the Navy Washington, DC 20372
8a NAME OF FUNDING SPONSORING ORGANIZATION Naval Medical Research & Development Command 8b OFFICE SYMBOL (If applicable)	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER Public Health Service Reimbursable, 7XD202
8c ADDRESS (City, State, and ZIP Code) NMC NCR Bethesda, MD 20814-5044	10 SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO / PROJECT NO / TASK NO / WORK UNIT ACCESSION NO

11 TITLE (Include Security Classification) (U) EVALUATION OF CASE MANAGEMENT PROCESS FULFILLMENT: THE FIRST SIX MONTHS OF U.S. PUBLIC HEALTH SERVICE OPTICOMAP IMPLEMENTATION IN NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION FLEET OPERATIONS

12 PERSONAL AUTHOR(S)
Anne Hoiberg

13a TYPE OF REPORT	13b TIME COVERED	14 DATE OF REPORT (Year, Month, Day)	15 PAGE COUNT
Interim	FROM _____ TO _____	1989, June, 19	

16 SUPPLEMENTARY NOTATION

17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Case Management, Return-to-work Plan, Cost Containment, Occupational Illness and Injury, Care Coordination, Evaluation Program (EG)

19 ABSTRACT (Continue on reverse if necessary and identify by block number)

The purpose was to analyze the effectiveness of a case management process (OPTICOMAP) as assessed on such criteria as the evaluation levels of process, impact, and outcome during the first six months of implementation to be contrasted with evaluations of cases from a pre-OPTICOMAP period. Participants included 42 maritime wage marines who experienced an occupational injury or illness during the first six months of OPTICOMAP implementation in 1987-88 and 29 maritime wage marines who had sustained an occupational injury or illness in 1985-86. While improvements were observed for all process and impact evaluation criteria (implementation of OPTICOMAP and return-to-work plans, timeliness, and role fulfillment), significant changes only were noted for responsiveness of the Department of Labor claims examiners and follow-up contacts with the injured employee by the line supervisor and case manager. Results showed that mean costs for medical care, compensation payments, and lost time wages decreased after OPTICOMAP implementation. Other outcome results included significant increases in the number of workers returned to light duty and decreases in the number of days to case closure as well as the extent of each participant's involvement in a case.

20 DISTRIBUTION/AVAILABILITY OF ABSTRACT	21 ABSTRACT SECURITY CLASSIFICATION
☐ UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT ☐ DTIC USERS	Unclassified
22a NAME OF RESPONSIBLE INDIVIDUAL Anne Hoiberg	22b TELEPHONE (Include Area Code) (619) 553-8461
	22c OFFICE SYMBOL 40

DD FORM 1473, 84 MAR 83 APR edition may be used until exhausted. All other editions are obsolete

Unclassified

☆U.S. Government Printing Office: 1985—607-047